Psychological Factors in Computer Assisted Instruction Systems: Strategies for Enhancing Learning Motivation

Ying Li
The College of International Studies, Yangzhou University, Yangzhou, 225009, P.R. China
syfs158@163.com
http://orcid.org/0000-0003-1783-9083

Abstract: Computer assisted instruction system construction has gradually become the core direction of college education transformation. However, in the absence of instructional design guidance and teaching content integration, computer assisted instruction may cause students' cognitive load, lack of subjectivity, technology dependence, and other psychological problems. Therefore, to optimize the current application of computer assisted instruction system, this study analyzed the psychological factors of sensory experience and subjectivity awareness based on the practical teaching application of computer assisted instruction system. Using empirical research techniques, the present shortcomings in the use of computer assisted instruction systems were also investigated. According to the findings of empirical study, computer-assisted instruction systems may make it more difficult for pupils to become more motivated to learn as their cognitive load increases. Therefore, when building a smart instructional system with the help of computer technology in current universities, they need to focus on strengthening the publicity of the application strategy of smart instructional technology and increasing students' awareness of technological factors. Teachers need to guide the classification of digital resources and the design of assignments to reduce the cognitive load of students, thereby increasing students' learning motivation in the smart teaching environment.
Keywords: Assisted Instruction; Computers; Instructional Space; Psychology; Learning Motivation

1. INTRODUCTION

With the speed at which computer technology is developing in today's world, big data, and artificial intelligence (AI) technologies have helped to integrate educational scenarios and expand the classroom. However, the expansion of teaching space and the reshaping of teaching interactions may also bring chaos to the management of colleges and universities. From a psychological perspective, the explosion of teaching information increases students' cognitive load and reduces their scrutiny of technology. This may cause students to fall into problems such as technology dependence and lack of subjectivity. Therefore, the application design of computer assisted instruction (CAI) in the field of education is still the focus of research. To

ascertain students' academic achievement and scientific involvement within a CAI system, Dap og and Orogan employed a quasi-experimental research design. The findings demonstrated that students exposed to CAI received "quite satisfactory" scores on the post-test, and that they also gave "improvement needs" feedback on the pre-test and post-test. According to the study's findings, CAI improved students' cognitive engagement as a scientific learning aid (Dap-og & Orongan, 2021). LeJeune and Lemons used a single-case alternating treatment design to examine the impacts of literacy training on paper and tablets in order to investigate how CAI affected the behavior and academic performance of children with intellectual and developmental disabilities. Results showed that CAI resulted in a decrease in challenging behaviors, an increase in academic engagement, and drove one student's academic performance for two-thirds of the students (LeJeune & Lemons, 2021). Iterbeke et al. assessed the "choice of examples" method's efficacy in a computer-assisted financial education course. The results showed that sample selection did not increase students' financial literacy, did not affect the average student's interest in financial topics, and resulted in significant motivational deficits in students with low perceptual ability (Iterbeke et al., 2022). To summarize, the current CAI may produce completely opposite effects under instructional design and application. Therefore, in order to realize the enhancement of students' learning motivation through CAI. This study analyzes the application of CAI and makes recommendations for improvement. The aim of the study is to improve the adaptability of CAI in the practice of higher education and to provide lessons for the enhancement of students' learning motivation.

2. PSYCHOLOGICAL FACTORS OF COMPUTER ASSISTED SYSTEM IN TEACHING PRACTICE

2.1 Practical Application of Computer Assisted System in Teaching and Learning

In the 1960s, computers were developed to assist teaching and learning, participating in teaching practices by processing instructional data, performing statistical analysis, and other functions. Accompanied by decades of development, computers have continued to introduce microcomputer technology, graphical user interface technology, and AI technology in the work of instructional assistance. The current CAI system

has created a better, more personalized and interactive teaching space through the incorporation and innovation of technology. On the one hand, instructional practices under computer assisted system are carried out through the optimization of data processing. Modern CAI system can integrate the data content of individual students, classroom performance, school management, regional resources and so on. The computer system integrates the data resources in the regional network with the campus online learning platform, and integrates and processes students' individual life data and learning assessment data to support teaching and learning management (Zhang, 2021). It can assist educators in comprehending the challenges that students face in their personal lives and in completing their coursework. Through the computer system, the teacher and the student subject and the object of teaching content can improve the teaching activities based on the rules formed by the computer and data. With the help of computers and media platforms, teachers are able to present digital teaching resources through visualization. With the computer's storage of student information, teachers are also able to observe the differentiated performance of students in teaching, thus guiding teachers to develop a more personalized teaching plan (Chougale et al., 2021). On the other hand, instructional practices under computer assisted system are also carried out through changes in the shape of instructional space. Under the current CAI system, the current classroom practice in higher education presents the qualities of multimodal teaching. First of all, the computer system also strengthens the connection between the real teaching space (RTS) and the virtual teaching space. For example, with the help of sensor technology, the computer system can sense the environmental data of the RTS, and adjust the temperature or light in the RTS through intelligent identification and monitoring. With the cloud storage function of the network platform, teachers can track students' learning process through the virtual space, thus providing data support for teaching evaluation (Chevalère, 2022). The computer assisted system links the pre-course teaching space, the in-school teaching space and the after-school teaching space. AI has been introduced into the construction of teaching and learning environments with the help of computer assistance. The teaching and learning process is becoming more and more interactive with students' senses with the help of technology. However, the computer as a medium to assist in the presentation of instructional content has also crowded the time of traditional teaching. This has resulted in some of the functions of

the CAI system being grafted onto the time before or after the classroom. For example, teachers assign lesson plans through computer assisted system and ask students to carry out pre-study activities in accordance with the plans through online media. However, in CAI system, in order to adhere to the leading function of teachers and the subject position of students, teachers need to take the initiative to explore the application effect of technology on teaching. Therefore, with the assistance of modern CAI system, the shape of course teaching space becomes more and more diversified. The classroom teaching space and the teaching space before and after class are integrated by computer technology and gradually become symbiotic teaching spaces. In the pre-course preparation, teachers analyze students' information through computer assisted system and make teaching planning adapted to the teaching content (Khasawneh et al., 2024). In the classroom development, with the help of the teacher can introduce the situation with the help of smart media and start the discussion of the problem. According to the content of the problem, the students are assigned to explore the task. Students are invited to present their independent learning results by forming learning teams through group support. After the students' presentations, the teacher evaluates the students' learning outcomes and teaches new knowledge. Finally, through the arrangement of homework after class, students are urged to consolidate and summarize or expand their learning.

2.2 Psychological Factors of CAI System in Teaching and Learning

First, the issue of differentiated experience with sensory factors. Differences in instructional spaces bring differentiated sensory experiences to students, and there are differences in the stimuli obtained during the learning process as well as in the neural circuits for learning. In teaching practice, computer systems expand multiple teaching spaces. However, the ability of computer technology-supported instructional space environments to support learning still depends on the match between students' learning intentions and the way they are taught with the resources provided by the technological environment. If the way learning resources are given in multiple instructional spaces is differentiated, while students' learning intentions are homogenized (Pristiwanto, 2023). This may lead to the fact that only part of the computer assisted system's delivery methods that are aligned with the students' learning intentions are synergistic for the students' learning, while the other part reduces the effectiveness of the learning due to the increase of the students' cognitive load. Therefore, from

the perspective of psychological sensory factors, the practical application of CAI system needs to have at least two aspects of optimization. In the first aspect, the technological factors and feeding methods must be gradually transparent in the actual teaching to reduce the cognitive load of CAI participation for students. In the second aspect, teachers must act as a guide to maintain the consistency of teaching content in multiple teaching spaces, so as to proactively establish the integration and symbiosis of teaching spaces, and to avoid students' inability to accept diversified CAI delivery methods (Adara & Haqiyah, 2021).

Secondly, the problem of subjectivity under cognitive factors. The current transformation of the teaching and learning environment by the CAI system may also cause the problem of students' subjective awareness. Under the transformation of data and technology, human beings as subjects of life can face the dilemma of being marginalized in the learning environment. For example, computer technology collects a large amount of data information from students in instruction, but students' lack of ability to recognize and select data information leads them to become subordinate to instructional data instead. When using data, students are unable to assess the accuracy and dependability of the information (Nasri et al., 2021). In the online teaching space, students are susceptible to being misled by undesirable information and may also increase their reception of useless information. In addition, computer technology may deprive some students of the opportunity to think and reflect on their own in their teaching practice. Students are accustomed to the identity of consumers in the online teaching space, and assisting assignments through online teaching resources may also lead to students' academic inertia, and they are prone to dependence on digital teaching resources. Students are more inclined to solve problems through computers and technological achievements when facing dilemmas in learning and life. However, while computer technology improves students' learning efficiency, it also reduces their time for independent thinking and active reflection (Richter et al., 2022).

3. EVALUATION OF INSTRUCTIONAL APPLICATIONS OF COMPUTER ASSISTED SYSTEM TEACHING

3.1 Design of Empirical Analysis

The study will employ the questionnaire experimental approach to investigate students' academic accomplishment and learning motivation in

teaching practice in order to assess the teaching application of the CAI system. In the questionnaire survey, the students' evaluation results will be quantitatively analyzed mainly by obtaining the students' feelings under CAI system, so as to explore the influence mechanism of students' learning motivation under CAI system. In the selection of the experimental subjects, the study mainly included the following factors in the examination criteria: 1. whether the universities have a regular CAI system or not. 2. Whether college teachers have the information literacy foundation to support CAI, and whether they are able to carry out teaching activities through computer technology. 3. In the grouping of experimental subjects, we try to choose classes with the same number of subjects, academic contents and other basic conditions, so as to exclude the influence of other factors on the experimental results. The study is conducted as an empirical research using Class A and Class B of the same major and grade in a university as experimental subjects. As a result of the investigation, teachers in this university are equipped with computers, projection and whiteboard equipment to assist teaching and learning, and a professional e-teacher system is used for daily teaching. Meanwhile, there exists an intelligent learning web platform operating within the campus for aiding instructional decision making and data analysis. The institution has equipped subject teachers with specialized tablet devices for teachers to borrow in their teaching practice. Some of the IT teachers and laboratory teachers are also equipped with computer devices for student use. The study sets 36 students in Class A as the control group (CG) and 35 students in Class B as the experimental group (EG). The CG is taught using traditional teaching methods and the EG is taught using the practical application of CAI system in chapter one. The experiment lasts for 12 weeks with 2 class hours per week.

3.2 Questionnaire Design

The questionnaire is designed to contain 6 sections: the section on cognition of CAI system contains 2 items. The students' learning motivation section contains 5 questions. Students' learning cognitive load contains 3 items. Students' learning self-control contains 2 items. Students' subjectivity contains 3 items. Students' data and information literacy contains 2 items. The questionnaire contains a total of 17 questions, all of which are objective. Each question is set with five options: not at all, basically not, partially loaded, basically loaded, and fully loaded. The options are quantified by a five-point Likert scale from 1 to 5 respectively. The specific questionnaire is shown in Table 1.

Table 1: Questionnaire Survey Items on Students' Learning Situation

Influence Factor	Specific Question Items
Cognition of CAI System	Q1: I Often Use Computer Equipment to Assist in Learning
	Q2: The Digital Information on the Internet is of Great Help to My Learning.
Learning Motivation	Q3: I Think the Course Teaching is Interesting
	Q4: I Understand the Application of Course Knowledge in Daily Life
	Q5: I Hope to Learn More Knowledge in the Course
	Q6: I Will Seek Opportunities to Participate in Interactions in the Classroom
	Q7: I Hope to Have More Practical Activities To Participate in the Classroom
Learning Cognitive Load	Q8: The Course Content is Difficult for Me
	Q9: I Have Resistance to Participating in Classroom Interactions
	Q10: I Lack Time For Thinking in Class
Learning Autonomy	Q11: I Can Fully Comply with Classroom Discipline
	Q12: I Am Able to Actively Think and Understand the Content Taught by the Teacher
Interactivity in Learning	Q13: I Think Teachers Understand My Learning Situation
	Q14: I Often Solve Problems Through Communication with Teachers
	Q15: I Think the Current Teaching Interaction Lacks Personalization
Data and Information Literacy	Q16: I Am Proficient in Using Computers to Carry Out Learning Activities
	Q17: I Understand the Ways to Obtain Teaching Resources in Computer Networks

The questionnaires for the experiment are conducted through offline on-site distribution and collection, with one questionnaire before the beginning of the semester and one after the completion of the semester. To ensure the efficiency of questionnaire recovery, the study conducted the questionnaire survey by on-site distribution and on-site recovery. After recovering the results of the questionnaires, the study uses SPSS24 software to integrate and analyze the data. The independent sample t-test is used to test the group differences as well as the pre- and post-course differences. Meanwhile, by analyzing the overall Cronbach's alpha coefficient of the scale, the reliability coefficient of the scale is 0.806, indicating that the questionnaire has a good reliability.

3.3 Empirical Findings

Through the use of a questionnaire, the first study examines the group differences between the two student groups prior to the start of the course.

The statistical significance of the differences between the control and EGs is higher because the level of significance is smaller than 0.05. Table 2 displays the findings of the survey's analysis of the variations in the scale's six dimensions.

Table 2: Analysis of Group Differences Before the Course

Dimension	Grouping	Number of Cases	Mean	Standard Deviation	T	Sig
Cognition of CAI System	CG	36	6.91	0.5	-0.38	0.70
	EG	35	6.71	0.6		
Learning Motivation	CG	36	18.32	2.0	0.62	0.54
	EG	35	17.15	2.5		
Learning Cognitive Load	CG	36	8.25	1.0	1.21	0.23
	EG	35	7.21	1.2		
Learning Autonomy	CG	36	7.97	0.8	-0.18	0.86
	EG	35	8.06	0.9		
Learning Interactivity	CG	36	10.44	1.5	-0.10	0.92
	EG	35	10.49	1.6		
Data and Information Literacy	CG	36	6.73	0.7	-0.29	0.04
	EG	35	6.95	0.8		

In Table 2, the significance test of the difference between the CG students and the EG students on cognition of CAI system is 0.7, which is greater than 0.05. It shows that there was no statistically significant difference (SSD) between the two groups of students on cognition of CAI system. Meanwhile, the significance of learning motivation, learning cognitive load, learning autonomy, and learning interactivity of the two groups of students are 0.54, 0.23, 0.86, and 0.92, respectively, which are greater than 0.05. Therefore, there is no SSD between the student groups on the dimensions of cognition of CAI system, learning motivation, learning cognitive load, learning autonomy, and learning interactivity. In data and information literacy, the significance of the difference between the EG and the CG is 0.04, which is less than 0.05. This indicates that there is a SSD in data and information literacy between the two groups of students. It can be hypothesized that originally there may be uneven levels of cognition of CAI system among student groups (Santos et al., 2021). Meanwhile, the study will compare the differences in the six dimensions before and after the students in the EG carried out the instruction. Table 3 displays the particular outcomes.

Table 3: Analysis on the Difference of the Investigation Results of the EG Before and After Class

Dimension	Question Items	Number of Cases	Pre-Course Average	Average Value After Class	T	Sig
Cognition of CAI System	Q1	35	3.15	3.29	3.18	0.002
	Q2	35	3.56	4.09	9.96	<0.001
Learning Motivation	Q3	35	3.59	3.68	2.82	0.006
	Q4	35	3.41	3.56	3.74	0.000
	Q5	35	3.24	3.62	8.97	<0.001
	Q6	35	3.56	3.79	5.94	<0.001
	Q7	35	3.35	3.71	8.92	<0.001
Learning Cognitive Load	Q8	35	2.09	1.29	-5.87	<0.001
	Q9	35	2.97	2.71	-5.86	<0.001
	Q10	35	2.21	1.59	-5.93	<0.001
Learning Autonomy	Q11	35	3.94	4.32	8.92	<0.001
	Q12	35	4.12	4.26	3.51	0.001
Learning Interactivity	Q13	35	3.49	3.76	6.94	<0.001
	Q14	35	3.18	3.29	3.31	0.002
	Q15	35	3.82	4.35	11.83	<0.001
Data and Information Literacy	Q16	35	3.74	4.38	11.96	<0.001
	Q17	35	3.21	3.49	6.71	<0.001

In Table 3, in both questions of cognition of CAI system, the mean evaluation of the students after the class has risen compared to the pre-course evaluation. The significance of the difference between before and after is 0.002 and <0.001 respectively, and the significance value is less than 0.05. The outcomes reveal that following classroom training, students' understanding of the CAI system has significantly deepened. Whereas, in the dimension of learning motivation, the mean evaluation of students after class rose in all the five items compared to the pre-course evaluation. Whereas the significance of the difference between before and after is 0.006, 0.000, <0.001, <0.001, <0.001, <0.001, and the significance value is less than 0.05, respectively. The data indicate that students' learning motivation rises significantly after the classroom instruction. In addition, in the dimension of cognitive load, the mean evaluation of the three items before class is 2.42, while the mean evaluation after class is 1.86. Meanwhile, the significance of the difference between the evaluations before and after class is less than 0.001. The cognitive load of the pupils in the CAI classroom has significantly increased. In the dimension of learning

autonomy, the mean evaluation of the two questions is 4.03 in the pre-course and 4.29 in the post-course, and the significance of the difference is less than 0.05. Thus, the data suggests that CAI classroom has significantly increased the learning autonomy of the students. Whereas, in the dimension of learning interactivity, the mean pre-course evaluation of the three question items is 3.49, which increases to 3.80 at the end of the class. The significance of the difference between pre- and post-course is less than 0.05. Therefore, CAI classrooms significantly increase students' opportunities for learning interactions in the classroom. Finally, in the dimension of data and information literacy, the average rating is 3.48 before the class and rises to 3.94 after the class, and the significance of the difference between before and after the class is less than 0.001. The data suggests that CAI classroom can significantly improve students' data and information literacy. In addition, the study is also conducted with the EG of students. Learning motivation among the six dimensions of the questionnaire results is used as the outcome variable. The remaining five dimensions are used as predictor variables to analyze the effect of cognition of CAI system, learning cognitive load, learning autonomy, learning interactivity, data and information literacy on students' learning motivation. Table 4 displays the particular outcomes.

Table 4: Analysis of Factors Influencing Learning Motivation

Variable		**Fit Index**			**Regression Coefficient**		
Outcome Variable	Predictive Variables	R	R^2	F	β	t	*P*
Learning Motivation	Cognition of CAI System	0.28	0.08	4.34	0.19	2.84	**
	Learning Cognitive Load	0.66	0.43	22.19	-0.11	-2.22	**
	Learning Autonomy	0.78	0.60	38.23	0.16	3.01	***
	Learning Interactivity	0.39	0.15	15.17	0.65	9.91	***
	Data And Information Literacy	0.49	0.24	25.62	0.05	1.30	**

In Table 4, ** denotes $P<0.05$ and *** denotes $P<0.01$. Student's cognition of CAI system significantly positively predicts student's learning motivation with a regression coefficient of 0.19, $P<0.05$. Whereas student's learning cognitive load significantly negatively predicts students' learning motivation with a regression coefficient of -0.11, $P<0.05$. Meanwhile, students' learning autonomy significantly and positively predicts students' learning motivation with a regression coefficient of 0.16, $P<0.01$. Students'

learning interactivity significantly and positively predicts students' learning motivation with a regression coefficient of 0.65, $P<0.01$. Finally, students' data and information literacy significantly and positively predicts students' learning motivation with a regression coefficient of 0.05, $P<0.05$.

Overall, in current university CAI courses, students' learning motivation is influenced by their understanding of computer teaching data and information literacy, learning cognitive load, learning autonomy, learning interactivity, and other factors. In the current post course questionnaire test, although the evaluation of various dimensions has significantly improved compared to the pre-course test evaluation, it is still at a moderate level. For example, the average evaluation (AV) of the cognition of CAI system is 3.69, the AV of students' learning motivation is 3.67, the AV of students' cognitive load is 1.86, the AV of students' learning autonomy is 4.29, the AV of students' learning interactivity is 3.8, and the AV of students' data and information literacy is 3.94. According to the quantitative method of the questionnaire, 3 points indicate partial compliance, and 4 points indicate compliance. While most of the dimensions are rated between partially met and met, only the learning autonomy dimension exceeds 4 points and data and information literacy is close to 4 points. Therefore, in the current CAI courses, in order to improve students' motivation, all the dimensional aspects need to be optimized except for students' learning autonomy and data and information literacy (Ebadijalal & Moradkhani, 2025).

4. STRATEGIES FOR ENHANCING LEARNING MOTIVATION IN COMPUTER ASSISTED SYSTEM TEACHING PRACTICE

4.1 Enhancing Practice Awareness of CAI

First of all, CAI practice must focus on the play of student subjectivity. The intelligent classroom under the control of CAI system has been detached from the traditional teaching method in teaching form, presenting complex and diverse form characteristics. This is an important reason for the current college students' insufficient cognition of CAI system (Hung et al., 2023). For example, when students believe that the teaching process is dominated by computer technology and AI, it may trigger students' over-reliance on computer technology. Moreover, when students perceive that computer technology lacks assistive effects in teaching, it may cause them to miss some of the teaching resources and information. Therefore, in order to improve students' cognitive level of computer-assisted intelligent

teaching, it is necessary to firstly enhance students' subjectivity in CAI. Students exhibit the problem of passive learning or technology dependence when they lack the cognition of CAI. Teachers need to guide students to establish subjectivity in intelligent instruction (Arslanova et al., 2024). Specifically, teachers and institutions should offer certain courses or lectures related to online media ethics to students. They should help students establish correct values towards computer technology, promote the development of Internet social etiquette, and improve students' moral literacy in the application of network technology. In addition, when dealing with diversified digital teaching resources, teachers of all disciplines should guide students to adopt differentiated learning methods for different types and media of resources, and help students build up the practical ability of classifying online teaching resources. In teaching, for the learning weaknesses of different students, teachers can first recommend some teaching resources for students that are adapted to their learning situation. This can help students explore the teaching content in them and guide them to complement their strengths through computer technology (Alamer & Al Khateeb, 2023).

Secondly, in order to prevent students from neglecting the resources and help provided by computer-assisted in teaching, it is necessary to improve the system construction of CAI system in practice. Colleges and universities should introduce refined strategies for technology application and curriculum development when introducing computer technology in teaching practice. For example, through internal meetings, teachers are informed about the construction plan of computer equipment and technical facilities, the updating of the concept of digital teaching culture, the direction of the change of teaching methods, and the needs of the national top-level design. Teachers should actively apply the CAI strategy in their own teaching practice after learning about it. This is done by changing the content of teaching, explaining to students the functions of the technological environment, and introducing students to the status and access to digital teaching resources in specialized disciplines (Hsieh et al., 2020). Through the level analysis and propaganda from institutions to teachers and from teachers to students, students are helped to understand the development strategy and functional system of CAI technology in colleges and universities. Meanwhile, in the construction of CAI system, institutions and teachers need to clarify the method of computer technology governance. Institutions must strengthen the supervision of the application of network teaching technology to ensure the data security of the network teaching platform within the campus. Institutions can work

with professional teachers and students in technology governance. The management and operation of technology is given to professional teachers through a project-based approach. Teachers, on the other hand, can provide students in related majors with practical opportunities to work with technology by organizing students to work together to carry out project-based teaching (Park & Son, 2022). Overall, by increasing students' subjectivity in the classroom and helping students to recognize the conduct and function of the CAI system, it can increase students' motivation to learn in CAI.

4.2 Reducing Cognitive Load in CAI

From the students' sensory point of view, CAI brings a large amount of digital resources and information to the classroom, which enriches the classroom form and also increases the students' cognitive load of information (Bahari, 2023). To reduce the cognitive load of CAI, firstly, teachers need to extract the commonality of diverse teaching forms and guide students to apply digital learning resources based on the commonality of learning. Teachers need to examine the flow of data in different teaching spaces when discovering the commonalities of multiform teaching spaces under computer technology. Institutions should cooperate with teachers' teaching needs and develop or purchase data monitoring equipment corresponding to the teaching space according to the characteristics of different teaching spaces such as RTS, virtual teaching space, and network teaching platform (Djami, 2022). For example, in the RTS, data are systematically summarized through intelligent monitoring equipment and big data analysis technology. After analyzing the data, teachers need to provide students with complementary data services as a teaching guide, and provide mutual and efficient complementary data support in each teaching space. When integrating data services and resource content across multiple teaching spaces, teachers need to use computer network platforms to establish learning communities. Through communication and experience sharing among teacher teams, the way of resource application in the teaching process is optimized. Accurate data information recommendation is done to avoid the burden of classroom participation of large amounts of data information on students' cognition (Yousef, 2021).

Secondly, current higher education needs to utilize computer technology to reduce the cognitive load for students in the design of assignments. The content of homework teaching in colleges and universities is usually associated with the content of course teaching (Zhou et al., 2024). However, the current course teaching with the help of digital resources and

computer technology is increasing in the breadth of content. Teachers have constrained information resources to enter the classroom through professionalism and categorization work, thus reducing the cognitive load of students in classroom teaching. However, due to the lack of guidance, students may be faced with the situation that the digital resources they use to complete their studies exceed their memory processing capacity, thus increasing the difficulty of their extracurricular learning. The extracurricular learning that teachers supervise students to carry out through homework should be designed to reflect the hierarchical character of homework. Through the AI assistance of the online teaching platform, teachers can understand the learning situation of students through data visualization. From there, they can develop personalized homework recommendations for students, and set a set of basic homework and improvement homework for each student (Ebadijalal & Yousofi, 2024). In observing students' learning ability and cognitive satisfaction with extended learning tasks, students are provided with enhancement as arrangements. When it is understood that students fall into a state of learning difficulties and cognitive load, students are provided with basic assignments. In conclusion, through the teacher's classification of data and resources, and the intelligent design of hierarchical assignments, the cognitive load of students in learning is reduced, thus improving their learning motivation (Dos Santos, 2021).

4.3 Improving the Interactivity of CAI

In the CAI environment, the frequency of application of online interaction is increasing, and it gradually becomes an important supplement to face-to-face interaction. Therefore, in order to improve the interactivity of CAI, teachers need to make reasonable use of both offline and online interactions. When dealing with students with high initiative, teachers should increase offline communication (Yang et al., 2023). For some students with low initiative personality, teachers should reasonably utilize both offline and online interactions to avoid students' anxiety about interactions. Teachers should also actively guide students to adapt to a variety of interactive environments and encourage students with low initiative personality to actively participate in classroom activities. Teachers must focus on the correlation between online and offline learning when using a hybrid offline-online interaction. In developing students' active personalities, teachers can motivate students to participate in the classroom from a sense of responsibility. They can encourage students to come up with innovative solutions to teaching and learning problems, and provide

certain rewards for students who are active in interaction, so as to form a benign atmosphere of classroom interaction (Mohammadi & Modarresi, 2023). In addition, teachers can also guide students' teamwork by forming learning groups. Group members are divided according to students' personality traits, so that students with high initiative drive the participation of low initiative personality. It promotes the atmosphere of students' independent learning in teamwork, thus increasing their freedom in teaching and learning (Lazarides & Chevalère, 2021).

Secondly, teachers need to realize diversified interactions through AI systems, design teaching contexts, and integrate teaching content into contextual interactions. Through CAI system, teachers are able to do random question and answer, classroom feedback and so on in teaching practice. Through the student learning report provided by the intelligent teaching system, students' learning progress and knowledge mastery are fed back in the interaction. When students can not adapt to the learning task, through the computer-assisted, teachers can do accurate, real-time counseling and question-and-answer sessions. This can adjust the learning strategy for students and realize the human-computer interaction synergy between the teacher-student body and the computer (Abdelshiheed et al., 2024). In teaching practice, teachers need to link teaching links through interaction, according to the chapter of teaching content or student learning feedback, to guide students to participate in interactive teaching. For example, teachers can develop thematic discussion courses according to the teaching content to carry out interactive teaching activities. It can provide timely feedback on students' communication performance in the classroom through offline or online methods. For example, it can present the progress of learning through the screen, discover the typical problems in the learning process through the teacher's comments, and correct the students' wrong learning understanding. To carry out interactive teaching activities in the classroom requires teachers to strengthen the control of the classroom (Lumbantobing, 2020). Teachers strictly control the practices and themes of interactive sessions, supervise and guide students to ensure that interactive behaviors revolve around learning content.

5. CONCLUSION

CAI system is more and more widely used in modern college education, but the change of teaching pattern by computer technology also has some effects on students' learning motivation. The study explored the effect of

CAI in practical application through empirical analysis. The results indicated that students' cognition of CAI, digital literacy skills, learning autonomy, and learning interactivity had positive predictive relationships with students' learning motivation. Meanwhile, students' cognitive load during the learning process had a negative effect on students' motivation. Therefore, the study proposes optimized countermeasures for the application of CAI system. Teachers and colleges and universities should pay attention to the play of students' subjectivity and improve the construction of CAI system, so as to increase students' cognition of technical factors in teaching. Meanwhile, teachers need to categorize teaching resources and promote the intelligent design of assignments to reduce students' cognitive load. Finally, teachers should mobilize students' interactive participation and enhance students' learning motivation through diversified interactive activities and plot design.

Reference

Abdelshiheed, M., Barnes, T., & Chi, M. (2024). How and when: the impact of metacognitive knowledge instruction and motivation on transfer across intelligent tutoring systems. *International Journal of Artificial Intelligence in Education*, *34*(3), 974-1007.

Adara, R. A., & Haqiyah, A. (2021). Improving Indonesian EFL learners' motivation through computer assisted learning (CALL). *Journal of English Language Studies*, *6*(1), 110-121.

Alamer, A., & Al Khateeb, A. (2023). Effects of using the WhatsApp application on language learners motivation: a controlled investigation using structural equation modelling. *Computer Assisted Language Learning*, *36*(1-2), 149-175.

Arslanova, K., Zh, A. A., & Aitpayev, A. (2024). THE IMPACT OF AI ON STUDENT MOTIVATION AND COGNITIVE SKILLS IN HIGHER EDUCATION. *Вестник науки*, *2*(11 (80)), 1034-1052.

Bahari, A. (2023). Affordances and challenges of technology-assisted language learning for motivation: A systematic review. *Interactive Learning Environments*, *31*(9), 5853-5873.

Chevalère, J. (2022). Towards dynamically monitoring computer-assisted instruction to reduce educational inequality. *Learning: Research and Practice*, *8*(2), 133-138.

Chougale, N., Kharade, K., Kharade, S., Ghatage, S., Mendagudli, M. G., Yuvaraj, S., & Vengatesan, K. (2021). Deployment of Computer assisted instruction in higher educational organization. *Recent Trends in Intensive Computing*, 461.

Dap-og, E. R., & Orongan, M. J. Q. (2021). COMPUTER-ASSISTED INSTRUCTION ON STUDENTS'ACADEMIC ACHIEVEMENT AND ENGAGEMENT IN SCIENCE. *International Journal of Teaching and learning*, *1*(1), 46-57.

Djami, C. B. N. (2022). Integrated technology for classroom management strategies in a computer-assisted language learning. *Jurnal Pendidikan Indonesia Gemilang*, *2*(2), 70-94.

Dos Santos, L. M. (2021). Motivation of taking distance-learning and online programmes: A case study in a TAFE institution in Australia. *Academic Journal of Interdisciplinary Studies*, *10*(6), 11-22.

Ebadijalal, M., & Moradkhani, S. (2025). Impacts of computer-assisted collaborative writing, collaborative prewriting, and individual writing on EFL learners' performance and motivation. *Computer Assisted Language Learning*, *38*(1-2), 291-315.

Ebadijalal, M., & Yousofi, N. (2024). 'Take me to a virtual trip if you want me to write better!': the impact of Google Expeditions on EFL learners' writing motivation and performance. *Computer Assisted Language Learning*, *37*(7), 1806-1828.

Hsieh, Y.-Z., Lin, S.-S., Luo, Y.-C., Jeng, Y.-L., Tan, S.-W., Chen, C.-R., & Chiang, P.-Y. (2020). ARCS-assisted teaching robots based on anticipatory computing and emotional big data for improving sustainable learning efficiency and motivation. *Sustainability*, *12*(14), 5605.

Hung, C. Y., Lin, Y. T., Yu, S. J., & Sun, J. C. Y. (2023). Effects of AR-and VR-based wearables in teaching English: The application of an ARCS model-based learning design to improve elementary school students' learning motivation and performance. *Journal of Computer Assisted Learning*, *39*(5), 1510-1527.

Iterbeke, K., Schelfhout, W., & De Witte, K. (2022). The role of students' interests during computer-assisted learning: A field experiment. *Computers in Human Behavior*, *130*, 107168.

Khasawneh, M. A. S., Ismail, S. M., & Hussen, N. (2024). The blue sky of AI-assisted language assessment: Autonomy, academic buoyancy, psychological well-being, and academic success are involved. *Language Testing in Asia*, *14*(1), 47.

Lazarides, R., & Chevalère, J. (2021). Artificial intelligence and education: Addressing the variability in learners' emotion and motivation with adaptive teaching assistants. *Bildung und Erziehung*, *74*(3), 264-279.

LeJeune, L. M., & Lemons, C. J. (2021). The effect of computer-assisted instruction on challenging behavior and academic engagement. *Journal of positive behavior interventions*, *23*(2), 118-129.

Lumbantobing, P. A. (2020). The contribution of lecturer pedagogical competence, intellectual intelligence and self-efficacy of student learning motivation. *Budapest International Research and Critics in Linguistics and Education (BirLE) Journal*, *3*(1), 564-573.

Mohammadi, J., & Modarresi, G. (2023). Conceptions of intelligence, teaching motivation and teacher creativity: A mixed-methods study. *Journal of Cognition, Emotion & Education*, *1*(2), 47-58.

Nasri, M., Shafiee, S., & Sepehri, M. (2021). An investigation of Iranian intermediate EFL learners' L2 motivation and attitude in a computer-assisted language learning environment. *Issues in Language Teaching*, *10*(1), 355-389.

Park, M., & Son, J.-B. (2022). Pre-service EFL teachers' readiness in computer-assisted language learning and teaching. *Asia Pacific Journal of Education*, *42*(2), 320-334.

Pristiwanto, P. (2023). Multimedia Based Prayer Learning Application Designing Using Computer Assisted Instruction (CAI) Method. *Jurnal Ekspresi: Desain Komunikasi Visual dan Seni*, *1*(01), 1-5.

Richter, J., Lachner, A., Jacob, L., Bilgenroth, F., & Scheiter, K. (2022). Self-concept but not prior knowledge moderates effects of different implementations of computer-assisted inquiry learning activities on students' learning. *Journal of Computer Assisted Learning*, *38*(4), 1141-1159.

Santos, R. S., Carvalho, A. C., Tsisar, S., Bastos, A. R., Ferreira, D., Ferreira, M. A., Povo, A., & Guimarães, B. (2021). How computer-assisted learning influences medical Students' performance in anatomy courses. *Anatomical Sciences Education*, *14*(2), 210-220.

Yang, Y., Zhang, H., Chai, H., & Xu, W. (2023). Design and application of intelligent teaching space for blended teaching. *Interactive Learning Environments*, *31*(10), 6147-6164.

Yousef, A. M. F. (2021). Augmented reality assisted learning achievement, motivation, and creativity for children of low-grade in primary school. *Journal of Computer Assisted Learning*, *37*(4), 966-977.

Zhang, J. (2021). Computer assisted instruction system under artificial intelligence technology. *International Journal of Emerging Technologies in Learning (iJET)*, *16*(5), 4-16.

Zhou, Y., Wu, X., & Qu, K. (2024). The Role of ChatGPT in English Language Learning: A Hedonic Motivation Perspective on Student Adoption in Chinese Universities. *Language Teaching Research Quarterly*, *43*, 132-154.